

I claim:

1. A calcination plant for a particulate feed material

5 comprising:

a storage silo for the feed material;

a calcination reactor;

a solid-gas separation unit;

10 and first means for fluidizing said particulate feed material from the silo and for sequentially conveying a resulting fluidized feed stream through the reactor and separation unit to produce a solid calcined product and a gaseous exhaust;

15 wherein said reactor and separation unit are enclosed in the storage silo and immersed in the particulate feed material stored therein.

20 2. The plant of Claim 1, further comprising a first heat exchanger between said gaseous exhaust and a reactor air stream used for fluidizing the particulate feed material conveyed to the reactor.

3. The plant of Claim 1, further comprising second means for fluidizing the particulate feed material prior to storage and for conveying a resulting fluidized feed stream to the storage silo.

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4. The plant of Claim 3, further comprising a second heat exchanger between said gaseous exhaust and a feed air stream used for fluidizing the particulate feed material conveyed to the silo.

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5. The plant of Claim 1, further comprising second means for fluidizing the particulate feed material prior to storage and for conveying a resulting fluidized feed stream to the storage silo; comprising a first heat exchanger between said gaseous exhaust and a reactor air stream used for fluidizing the particulate feed material conveyed to the reactor; and a second heat exchanger between said gaseous exhaust and a feed air stream used for fluidizing the particulate feed material conveyed to the silo.

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6. The plant of Claim 5, wherein said first and second heat exchangers are enclosed in the storage silo and immersed in the particulate feed material stored therein.

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7. The plant of Claim 1, wherein said solid-gas separation unit includes a cyclone.

8. The plant of Claim 6, wherein said solid-gas separation unit includes a cyclone.

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9. The plant of Claim 1, wherein said calcination reactor has a substantially cylindrical bottom portion including a fuel burner and said fluidized feed stream is introduced tangentially in the bottom portion such as to produce a cyclonic flow through the reactor.

10. The plant of Claim 9, wherein said calcination reactor has a substantially cylindrical bottom portion including a fuel burner and said fluidized feed stream is introduced tangentially in the bottom portion such as to produce a cyclonic flow through the reactor.

11. The plant of Claim 1, wherein said first means for fluidizing said particulate feed material from the silo and for sequentially conveying a resulting fluidized feed stream through the reactor and separation unit comprises at least one positive displacement blower.

12. The plant of Claim 10, wherein said first means for fluidizing said particulate feed material from the silo and for sequentially conveying a resulting fluidized feed stream through the reactor and separation unit comprises at least one positive displacement blower.

13. The plant of Claim 11, wherein said first means for fluidizing said particulate feed material from the silo and for sequentially conveying a resulting fluidized feed stream through the reactor and separation unit further comprises at least one
5 variable-speed draft fan for said gaseous exhaust.

14. The plant of Claim 1, wherein said first means for fluidizing the particulate feed material from the silo comprises a least one rotary valve for delivering the feed material from
10 the silo into a conduit to produce said fluidized feed stream.

15. The plant of Claim 13, wherein said first means for fluidizing the particulate feed material from the silo comprises a least one rotary valve for delivering the feed material from
15 the silo into a conduit to produce said fluidized feed stream.

16. The plant of Claim 1, further comprising means for injecting a silo air stream into the silo in order to promote uniform flow of the feed material out of the silo.

17. The plant of Claim 15, further comprising means for injecting a silo air stream into the silo in order to promote uniform flow of the feed material out of the silo.

18. The plant of Claim 16, wherein said silo air stream is pre-heated by heat exchange with said gaseous exhaust.

19. The plant of Claim 17, wherein said silo air stream is pre-heated by heat exchange with said gaseous exhaust.

20. The plant of Claim 17, wherein said silo air stream is pre-heated by heat exchange with said gaseous exhaust.

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